

Large Scale Inert Anode for Molten Oxide Electrolysis, Phase I

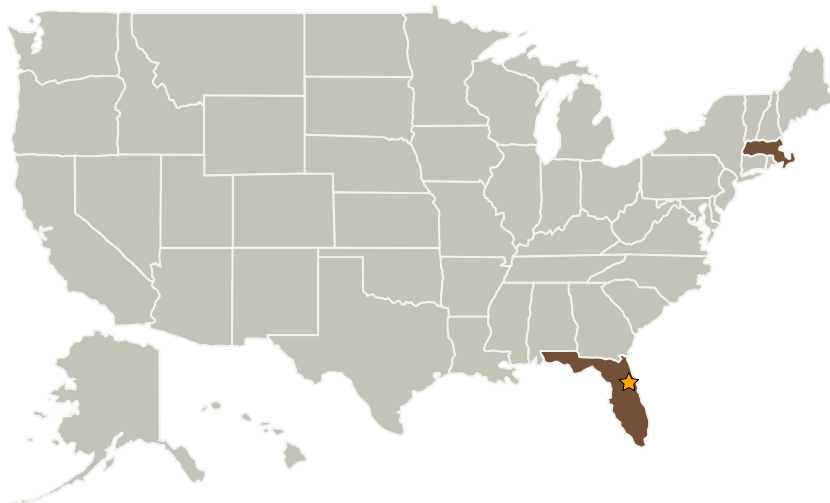
Completed Technology Project (2009 - 2009)



Project Introduction

Molten oxide electrolysis is a demonstrated laboratory-scale process for producing oxygen from the JSC-1a lunar simulant; however, critical subsystems necessary for a larger-scale, lunar-ready reactor must be further developed to increase technology readiness. An enabling technology of the MOE system that must be scaled is the iridium inert anode. Iridium, a proven inert anode in the process, is expensive, scarce, extremely dense, and difficult to fabricate. Electrolytic Research Corporation will develop a larger-scale anode optimized for cost, weight, material availability, and manufacturability. ERC proposes an optimized iridium-based alloy or composite anode using electrochemical and thermophysical materials selection criteria validated with experiments (electrolysis testing) and modeling. The iridium alloy and composite screening will generate results necessary for Phase 2, where a surface engineered, multi-layer anode will be designed that includes either a refractory-metal or carbon substrate, a conductive diffusion-barrier inner layer, and an iridium outer layer. Completion of the work will greatly enhance the technology readiness level of the NASA molten oxide electrolysis in-situ resource utilization program.

Primary U.S. Work Locations and Key Partners



Large Scale Inert Anode for Molten Oxide Electrolysis, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Large Scale Inert Anode for Molten Oxide Electrolysis, Phase I

Completed Technology Project (2009 - 2009)



Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Electrolytic Research Corporation, LLC	Supporting Organization	Industry	Sudbury, Massachusetts

Primary U.S. Work Locations

Florida	Massachusetts
---------	---------------

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.2 Observatories
 - └ TX08.2.1 Mirror Systems